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**Federal Communications Commission**

**FCC 98-187**

DEC 13

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**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of )

Inquiry Concerning the Deployment of )  
Advanced Telecommunications )  
Capability to All Americans in a Reasonable )  
and Timely Fashion, and Possible Steps )  
to Accelerate Such Deployment )  
Pursuant to Section 706 of the )  
Telecommunications Act of 1996 )

CC Docket 98-146

**NOTICE OF INQUIRY**

**Adopted: August 6, 1998**

**Released: August 7, 1998**

By the Commission: Commissioners Ness and Powell issuing separate statements.

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## I. INTRODUCTION

1. This proceeding concerns the arrival of the broadband communications services of the twenty-first century -- what Congress has called the "deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans." We intend for advanced technology to have every opportunity to flourish and herein we seek comment on ways to make its deployment more efficient and more inclusive. Advanced capability and services can create investment, wealth, and jobs. They can meaningfully improve the nation's productivity and educational, social, and health care services. They can create a more productive, knowledgeable, and cohesive nation.

2. Many signs point to a demand for advanced services. The Internet is one of the wonders of the decade. The computer industry, promoters of leading edge technologies, and millions of ordinary consumers are clamoring for high-speed access to it. More generally, demand for more "broadband" or "high-speed bandwidth" is increasing exponentially. Methods for delivering digital information at high speeds are emerging in all segments of the communications industry -- wireline telephone, terrestrial and satellite wireless, cable, and broadcast, to name only a few.

3. There are two sets of challenges standing between today and the availability of advanced services to all Americans. The first set is technical. Much of today's network, especially the copper wire that ends in the residential consumer's premises -- the so-called "last mile" -- is not broad or fast enough to be called "advanced." No matter how fast the rest of the network is, a slow last mile can deny the promise of advanced telecommunications capability. If advanced services are to be available to every American, there must be more bandwidth in the last mile to the home. In addition, rural areas must have a broadband "backbone" (long distance) facility close enough to make accessing it a local call, just as it is for most consumers.

4. Second, our regulatory system is uneven in its treatment of different technologies. Our statutes and rules contain separate regimes for wireline and wireless, for local and long distance, for telecommunications, broadcast, and cable television, and so on. Digitization and packet-switching, however, may lead these industries to compete with each other. At some point, it may distort the performance of the market to have separate regimes of regulation for competitors in a converging market. We intend to assess the suitability of the varying regulatory regimes and we will work with Congress to ensure that our rules serve the public interest.

5. We intend to rely as much as possible on free markets and private enterprise to deploy advanced services. We recognize, at the same time, that Congress has instructed us to promote the availability of telecommunications services generally and advanced services in particular to specific segments of the population, including low income people, people in rural areas, schools, classrooms, libraries and health care facilities. We underscore our commitment to following this instruction while also seeking to promote the deregulatory and

procompetitive goals of the 1996 Telecommunications Act ("the Act").

#### A. Statutory Framework

6. Section 706 of the Act<sup>1</sup> is a Congressional mandate to the Commission to examine the availability of advanced telecommunications capability to all Americans.<sup>2</sup> Section 706(a) directs the Commission and each state commission to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans." The statute defines "advanced telecommunications capability," "without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."<sup>3</sup>

7. In section 706(b), Congress specifically directs the Commission to begin this

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<sup>1</sup> Pub.L. 104-104, Title VII, § 706, Feb. 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157. It provides:

**SEC. 706. ADVANCED TELECOMMUNICATIONS INCENTIVES.**

(a) **IN GENERAL.**--The Commission and each State commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment.

(b) **INQUIRY.**--The Commission shall, within 30 months after the date of enactment of this Act, and regularly thereafter, initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) and shall complete the inquiry within 180 days after its initiation. In the inquiry, the Commission shall determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. If the Commission's determination is negative, it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.

(c) **DEFINITIONS.**--For purposes of this subsection:

(1) **ADVANCED TELECOMMUNICATIONS CAPABILITY.**--The term "advanced telecommunications capability" is defined, without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.

(2) **ELEMENTARY AND SECONDARY SCHOOLS.**--The term "elementary and secondary schools" means elementary and secondary schools, as defined in paragraphs (14) and (25), respectively, of section 14101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 8801).

<sup>2</sup> "Section 4 of the Bill [later section 706 of the 1996 Act] states clearly that this bill is intended to establish a national policy framework designed to accelerate rapidly the private sector deployment of advanced telecommunications." S. Rep. 104-23 at 27, March 30, 1995.

<sup>3</sup> 47 U.S.C. § 157 note.

inquiry, within thirty months of enactment of the 1996 Act, to find out whether advanced telecommunications capability is being deployed to all Americans in a "reasonable and timely fashion." The Commission must complete the inquiry within 180 days, and must take "immediate action to accelerate the deployment" of advanced telecommunications capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market if the inquiry determines that such capability is not being deployed in a reasonable and timely fashion.

## B. Overview

8. This Notice of Inquiry (NOI) begins the inquiry called for by section 706(b). After defining some statutory terms, our first step (in Section II.A) is to learn more about the status and broadband capabilities of existing and planned networks. We invite commenters to describe the advanced services that they want to provide. We also examine, and we invite others to comment on, the assets, abilities, and incentives of the companies that own the networks. We are asking: "Who is able and motivated to deploy advanced services soon, especially to residential consumers?" Are there market incentives, or will ones soon exist, that will induce firms to reach schools and classrooms, people in rural areas and inner cities, and other customers who are traditionally thought to be less profitable? We emphasize that our inquiry transcends all boundaries among today's industries and segments and classes of services, and extends to information service providers, electric utilities, privately owned systems, and any other business firm that can offer advanced services.

9. In Section II.B, we seek comment on how to determine whether advanced telecommunications capability is being deployed in a "reasonable and timely fashion" to all Americans. To what extent are advanced services being offered? Who offers them? What form does demand actually take? Does experience here, or in other nations, point the way to speedy deployment over this country in general and in specific instances such as schools and libraries.

10. In Section II.C, we invite proposals for action, especially "removing barriers to infrastructure investment and . . . promoting competition in the telecommunications marketplace,"<sup>4</sup> that we may take in the future if we determine that advanced telecommunications capability is not being deployed in a reasonable and timely fashion. We ask whether, in order to create and maintain a robustly competitive market for advanced facilities and services, a fundamental change in our statutes is needed.

11. This item is one of two items we are adopting contemporaneously. The

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<sup>4</sup> *Id.*

companion item is an Order and Notice of Proposed Rulemaking (NPRM).<sup>5</sup> That item is issued in response to six Petitions suggesting action we should take today or in the near future to speed the deployment by wireline carriers of advanced telecommunications capability.<sup>6</sup>

12. This proceeding is concerned with the longer-term future. We urge all segments of the communications and related industries, including cable, telephony, terrestrial wireless, satellite, broadcast and others referenced in paragraph 8 to participate. We especially welcome comment from those who could be directly affected by the outcome of this proceeding, such as consumers, schools and libraries, and rural health care providers. We also welcome comment from manufacturers and vendors of equipment, research laboratories, academics, securities and investment analysts, and market research firms. We want ideas that are not shaped narrowly by the interests of any incumbents, and presentations from companies that are not traditional telecommunications firms. It is critical that the analysis and debate surrounding section 706 focus not just on the more traditional, wired telecommunications network, but also on other emerging technologies for delivering higher bandwidth services. We also ask commenters to tell us how we can give the private sector the confidence to invest in new high-bandwidth technologies and to deploy them throughout this country.

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<sup>5</sup> Petition of Bell Atlantic Corporation for Relief from Barriers to Deployment of Advanced Telecommunications Services, CC Docket No. 98-11, *Memorandum Opinion & Order & Notice of Proposed Rulemaking*, FCC 98-188, adopted August 6, 1998.

<sup>6</sup> See, e.g., Petition of Ameritech Corp. to Remove Barriers to Investment in Advanced Telecommunications Capability, *Petition of Ameritech Corp.*, CC Docket No. 98-32, dated March 5, 1998; Petition of Bell Atlantic Corp. for Relief from Barriers to Deployment of Advanced Telecommunications Services, *Petition of Bell Atlantic*, CC Docket No. 98-11, dated Jan. 26, 1998 (Bell Atlantic Petition); Petition of Southwestern Bell Tel. Co. *et al.* for Relief from Regulation Pursuant to Section 706 of the Telecommunications Act of 1996 and 47 U.S.C. § 160 for ADSL Infrastructure & Service, *Petition of Southwestern Bell Tel. Co. et al.*, CC Docket No. 98-91, dated June 9, 1998 (SBC BOCs Petition); Petition of U S West Communications, Inc. for Relief from Barriers to Deployment of Advanced Telecommunications Services, *Petition for Relief*, CC Docket No. 98-26, dated Feb. 25, 1998 (U S West Petition). In this NOI, citations to filings (Comments, Reply Comments, Oppositions, *etc.*) are, unless specified otherwise, to filings made in response to one or all of these Petitions. See also *infra* note 75.

## II. DISCUSSION

### A. "Advanced Telecommunications Capability"

#### 1. Statutory Terms

13. Section 706(c)(1) defines "advanced telecommunications capability," "without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."<sup>7</sup> We seek comment on the meaning of these terms. Does the statute, its legislative history, or industry usage and custom provide any guidance to the meaning of such terms as "video telecommunications"? How do we determine whether a particular facility or service fits within the statutory definition of advanced telecommunications capability or is an "advanced service"?<sup>8</sup> Does advanced telecommunications capability include electronic program guides? We also note that section 706 concerns 'all Americans' and contains no reference to their fixed locations or mobile uses of telecommunications. We seek comment on whether advanced telecommunications capability that is provided using mobile or fixed technology should be distinguished for purposes of section 706.

14. The statute does not define the terms "broadband" and "high-speed." We seek comment on how we should define such terms. One possibility might be to define broadband to refer to "facilities with sufficient bandwidth (*i.e.*, speed) to offer the capability of transporting multiple channels of service." Another option might be to define these terms to refer to facilities with sufficient bandwidth to convey an amount of information in less than a certain amount of time or at a rate greater than a certain specific rate. We invite parties to comment on these definitions and to propose other possible definitions.

15. Parties should also consider whether Congress intended the meaning of "advanced telecommunications capability" to change over time, including new technologies as they are developed and excluding ones that were once cutting-edge but have since become conventional. For example, under such an interpretation, touch-tone technology might have been "advanced" in 1960. It would not be today, but technology for high-speed Internet access might be. We request comment about these interpretations, and more generally on how the Commission should evaluate and respond to the expansion of new technologies and their deployment in the mass market.

16. The statutory definition of advanced telecommunications capability also

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<sup>7</sup> 47 U.S.C. § 157 note.

<sup>8</sup> We distinguish between advanced telecommunications capability and services derived from it ("advanced services"), as in the distinction between infrastructure and applications, or between facilities and services offered to end users. We ask that commenters observe this distinction.

specifies "originate and receive." We ask whether this means to exclude one-way telecommunications. Second, we note that certain types of "push technologies" allow consumers to subscribe to data that is regularly refreshed. These arrangements allow subscribers to vary at will the data to which they subscribe. We seek comment on whether advanced telecommunications capability includes solely the origination and reception of data on a real-time basis, or whether it was intended to encompass such subscriber relationships as push technologies. Third, we ask whether advanced telecommunications capability includes content, such as web pages, in addition to the ability to reach content.

17. Finally, we welcome comment on the meaning of any other statutory terms. We invite clarification and definition of statutory terms such as "reasonable and timely." We also welcome comment about the relationship between sections 706(a) and 706(b), specifically whether action under one subsection should or must precede the other.

## **2. Current and Future Deployment of Advanced Telecommunications Capability**

18. In this Section, we survey the industries we oversee and several related industries. We examine what appear to us to be each one's assets, abilities and incentives to deploy advanced telecommunications capability and advanced services. We are most interested in learning others' perspectives on these matters. What existing or planned facilities will be capable of deploying some or all elements of advanced telecommunications capability, and what advanced services are being offered or planned? We request interested parties to inform us about their own (and other companies') present facilities, current construction, plans, and ideas. We welcome details: we urge all commenters to supply us, as appropriate, with depictions of existing networks, plans for new ones, technical descriptions, deployment schedules, maps, and cost projections. (Methods of disclosure of confidential information are discussed below in paragraph 90.) Particularly welcome would be estimates of the cost of the different kinds of "backbone" and "last mile" facilities (both wire and wireless),<sup>9</sup> perceptions of risk associated with each of them, and predictions about the willingness of the capital markets to finance any or all of them.

19. Incumbent Local Exchange Carriers (incumbent LECs): Last Miles. The incumbent LECs possess wire facilities that go the last mile to nearly every home and business in the United States. The last part of these last miles generally consists of copper that, as now used, lacks advanced telecommunications capability. The other parts of the incumbent LECs' last miles (those beyond the first point of concentration of copper loops in a neighborhood) are increasingly high-capacity fiber. This collection of facilities we have just described, as it is now used, is capable of providing "plain old telephone service" (POTS) and

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<sup>9</sup> For simplicity's sake, in this NOI we will use the terms "backbone" and "last mile" as shorthand for interoffice/long distance/international and local facilities and services, respectively.

data communications and Internet access via dial-up modems. They are the only facilities that go to almost every home in this country and now provide POTS. For these facilities to provide certain advanced services, they would need either expensive improvement by new last miles, probably consisting of fiber or wireless connections,<sup>10</sup> or new software or technology that will derive increased bandwidth from the existing twisted pair copper cable.<sup>11</sup>

20. Technology affording such increased bandwidth exists, is known as digital subscriber line (DSL), and takes many forms (collectively, xDSL).<sup>12</sup> To date, the most prominent forms are ADSL (asymmetric DSL) and HDSL (high-speed DSL). xDSL technology is capable of increasing the capabilities of the incumbent LECs' existing copper plant, and may be capable of offering many advanced services.<sup>13</sup>

21. Some incumbent LECs have unveiled plans to offer, or have begun to offer, xDSL service in some areas.<sup>14</sup> SBC expresses interest in offering it in inner-city and rural areas "if there is a proper balance of incentives, risk, and possible reward."<sup>15</sup> Other parties, however, question the incumbent LECs' incentive to deploy xDSL and other new technologies quickly. They point to what they allege are the incumbent LECs' huge investment in current technology<sup>16</sup> and their alleged history of being sluggish to deploy other new technologies,

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<sup>10</sup> LELAND J. JOHNSON, TOWARD COMPETITION IN CABLE TELEVISION 29-35 (1994).

<sup>11</sup> *Id.* at 38-41.

<sup>12</sup> DSL uses digital signal processing techniques to make possible the provision, on existing copper loops, of high-speed data communications without interfering with the carriage of voice service. DSL allows a copper loop to be used simultaneously for high-speed data service and ordinary voice service, and keeps the data capability available 24 hours a day. SBC BOCs Petition at 6-10; Comments of Ameritech Corp. on Bell Atlantic Petition at 4, 6 (April 6, 1998); Joint Comments of APK Net, Ltd., *et al.* on RBOC Petitions, n.5 at 3, 10 ("all [DSL] needs to work is a relatively clean, short, unswitched copper communications path. Copper. Point-to-point. No switching. No multiplexing. No fiber optics. No SONET. No intelligent network. No SS7. Just clean, unswitched, basic copper telecommunications paths, with xDSL equipment on both ends.") (April 6, 1998); Reply Comments of Comcast Corp. at 13 (xDSL "does not work on loops that have multiplexing systems . . . in the feeder portion; it does not work on loops that have 'load coils' on them; and beyond a certain point, xDSL delivers progressively lower data rates as circuit length increases until, ultimately, it does not work at all") (May 6, 1998).

<sup>13</sup> For technical information about xDSL, *see, e.g.*, BELLCORE, NOTES ON THE NETWORKS (Special Report-2275), Issue 3, Ch. 12 (Dec. 1997).

<sup>14</sup> *See, e.g., Bell Atlantic Jumps into ADSL Market with 3 Offers for Home Users*, COMM. DAILY, June 4, 1998, available at 1998 WL 10696558.

<sup>15</sup> SBC BOCs Petition at 34-35.

<sup>16</sup> *See, e.g., Comments of Covad Communications Co.* at 6 (April 6, 1998) (doubting that the ILECs, with "market power in local circuit-switched services . . . [will] immediately jump at the opportunity to obsolete that equipment").



such as ISDN.<sup>17</sup> Some of these parties also dispute that xDSL is better for high-speed data service, or advanced services generally, than a number of other technologies.<sup>18</sup>

22. We ask for detailed information about whether incumbent LECs are deploying advanced telecommunications capability, both within their present territories and outside them. We seek information concerning the number of incumbent LECs' exchange lines that are now capable of providing xDSL and advanced services generally. We understand that loops' usefulness for xDSL is greatly reduced if their length exceeds 18,000 feet or if they are encumbered by such common features as digital loop carrier, bridged taps and loading coils. How widespread are these attributes, and are they common enough to make xDSL effectively unavailable to a large number of customers at present? For those exchange lines over which the incumbent LECs cannot provide xDSL, we ask for comment on the cost of changing them to have that capability. We also ask for incumbent LECs' plans about future deployment of advanced telecommunications capability and the capability to provide xDSL.

23. Much of the incumbent LECs' fiber is not now in use.<sup>19</sup> We ask how much of this "dark fiber" is the "other part" of the last mile (beyond the first point of concentration of copper loops in a neighborhood) and how much of it is interoffice. We ask how much dark fiber capacity is present with existing optics and electronics and how much additional capacity could be realized with upgraded optics and electronics and at what cost? We also ask whether the deployment of advanced telecommunications capability would be advanced by our requiring that dark fiber be leased. What is preventing its deployment to meet any demand for advanced telecommunications capability?

24. We ask for comment on the effect of mergers and other consolidations on the deployment of advanced telecommunications capability. Will they speed or slow the development by the merged companies and their competitors? Will the net effect on

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<sup>17</sup> See, e.g., Comments of the Commercial Internet Exchange Association on Bell Atlantic Petition at 9 (April 6, 1998) ("the rate of innovation on the [traditional network], which has been Bell Atlantic's proving ground for decades, is far less impressive. For example, the ILECs' slow rate of ISDN deployment may be a harbinger of ILEC xDSL service roll-out."); Reply Comments of Level 3 Communications, Inc., at 6 (May 6, 1998) ("The BOCs either did not have the [advanced] technology, or did not want to make the technology available for fear of cannibalizing more profitable business"). See also Opposition of MCI Telecommunications Corp. to U S West Petition at 16 (April 6, 1998) ("with the exception of voicemail, the BOCs have almost nothing to show for their innovation plans in the area of information services").

<sup>18</sup> Reply Comments of Comcast Corp. at 18 (May 6, 1998) ("there does not appear to be any practical, market-based reason to promote xDSL deployment in comparison to other high-speed access technologies. [A]t any given time industry observers have different views about which of these systems is best suited to mass consumer demand.").

<sup>19</sup> Their total spare or "dark" fiber, as a percent of their total fiber deployment, was approximately 66% in 1991, 63% in 1992, 70% in 1993, 65% in 1994, 68% in 1995, 68% in 1996, and 67% in 1997. FCC ARMIS Report 43-08 (1991-97).

advanced services be more or fewer choices, and lower or higher prices, for American consumers?

25. Incumbent LECs: Backbone. Some regional Bell operating companies (RBOCs) claim that there is a shortage of backbone facilities that are capable of providing Internet-related services and advanced services generally, and that they can fill it.<sup>20</sup> Other parties dispute the existence of any shortage. They also see the marketplace filling the need for more backbone on its own, and faster than Commission inquiry and rulemaking proceedings could possibly move.<sup>21</sup> We seek comment on both these perspectives and specific identification of any areas where there is a shortage of backbone. For example, is any shortage relatively greater in intraLATA or interLATA routes?

26. The deployment of advanced telecommunications capability in rural areas is of particular concern to us. We welcome comments from both consumers and potential suppliers about rural areas. For example, do parties believe that xDSL technology is cost-effective in low-density service areas, so that no incentives are needed to stimulate investment in rural markets?<sup>22</sup> Is there any reason to expect a shortage of backbone or last-mile advanced telecommunications capability with access to, or in, rural areas?

27. Incumbent LECs: New Markets. Incumbent LECs may also enter new product and geographic markets, such as telecommunications in neighboring or faraway territories, the market of multichannel video program distributors (MVPDs),<sup>23</sup> and the market of information services providers (ISPs). If an incumbent LEC did that by building a broadband network to offer a bundle of services (such as telecommunications, high-speed Internet access and MVPD) in a neighboring territory, that might constitute the deployment of advanced telecommunications capability. It might also inject significant new competition into major uncompetitive markets. Most incumbent LECs, however, have avoided entering other territories or the MVPD market. We request comment on incumbent LECs' incentives to enter such new markets and on the implications of such entry on the deployment of advanced telecommunications capability.

28. We request comment on the soundness of the above analysis of the incumbent

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<sup>20</sup> See, e.g., Bell Atlantic Petition at 13-16 & accompanying Declaration of Professor Thomas W. Hazlett at 2-10.

<sup>21</sup> See, e.g., Reply Comments of Comcast Corp. at 5-6 (May 6, 1998) ("major backbone providers are taking steps to double their capacity approximately every three to four months.").

<sup>22</sup> Intermedia Communications, Inc. Comments Opposing Deregulation of Incumbent Local Exchange Carrier Networks & Services at 16-17 (April 7, 1998).

<sup>23</sup> 47 U.S.C. § 522(13) defines an MVPD as "a person such as, but not limited to, a cable operator, a multichannel multipoint distribution service, a direct broadcast satellite service, or a television receive-only satellite program distributor, who makes available for purchase, by subscribers or customers, multiple channels of video programming."

LECs' opportunities, incentives, and track record in deploying advanced telecommunications capability. We are interested in comments about both RBOCs and other incumbent LECs. Are non-RBOC incumbent LECs, in fact, deploying more advanced telecommunications capability than the RBOCs? If they are, is the difference attributable to the RBOCs' legal burdens, the other incumbent LECs' greater entrepreneurship or relatively small territories, or some other cause(s)? Whatever the reason, should we expect one group of incumbent LECs to have a greater incentive and ability to deploy advanced telecommunications capability?

29. Competitive LECs. Competitive LECs generally possess no market power, are relatively free of regulatory obligations, and typically lack installed, POTS-oriented, circuit-switched facilities. As a class, they do not lack resources. In 1997, the capital markets provided them with billions of dollars in funding.<sup>24</sup> We ask for comment, nevertheless, on whether there are competitive LECs that lack reasonable access to adequate capital and whether there are any steps the Commission could take to address this concern.

30. The competitive LECs are providing some services that duplicate the incumbent LECs', but are lower-priced in most cases, and other services that have capabilities in excess of the incumbent LECs'. Competitive LECs are deploying facilities on a large scale, mostly to serve large and medium-sized business customers, typically in central business districts in urban areas and suburban rings. A few competitive LECs also serve the work-at-home market.<sup>25</sup> The facilities that competitive LECs are deploying are mainly switches and interoffice lines, not substitutes for the copper in the last mile to the small business and residential customer's premises (the mass market). Thus, most competitive LECs remain dependent on the incumbent LECs' copper for the last mile. There are also several existing and potential competitive LECs that use radio spectrum for their last miles. For convenience's sake, we discuss them below under the heading High-Bandwidth Wireless, in paragraphs 42-44.

31. We ask for comment on the extent to which the competitive LECs are deploying advanced telecommunications capability. We particularly ask for comment on whether their abilities and incentives are likely to be limited to certain areas and kinds of customers, to certain elements of advanced telecommunications capability, and to supplementing incumbent LEC facilities rather than replacing them. Are competitive LECs likely to enter the mass market, and especially to become full, facilities-based competitors to the incumbent LECs on a large scale? In particular, we seek comment on whether competitive LECs are utilizing and installing technologies that will bypass incumbent LECs' essential facilities such as the local loop.

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<sup>24</sup> See, e.g., Teleport Communications Group Inc., *Memorandum Opinion & Order*, FCC 98-169 n.127 at ¶ 39 (released July 23, 1998); J P Morgan Securities Inc., *Telecoms in the Age of the Internet* at 9 (April 24, 1998); Paine Webber, *Pressures Mounting on RBOC EPS Growth* at 21, May 14, 1998.

<sup>25</sup> Comments of Covad Communications Co. at 4 (April 6, 1998) ("Covad's facilities-based, DSL network extends extensively to residential areas."). See also SBC BOCs Petition at 15-17 (Covad and others).

32. Interexchange Carriers (IXCs). There are several hundred IXCs. A few of them own most of the interLATA long distance telecommunications facilities in this country. These facilities were built primarily to provide voice and data telecommunications services and now serve as the basic transmission medium for Internet backbone traffic. We request comment, first, on whether these facilities constitute, in their present form or with minor enhancements, advanced telecommunications capability. Second, what advanced services are IXCs now offering or planning to offer on their interexchange facilities?

33. Third, is there, in fact, a shortage of Internet backbone? What are the construction plans of existing and emerging backbone providers? Is any shortage more acute in backbone running to rural communities or other areas in particular? Or is there, in reality, no 'shortage,' but simply the occasional, transient lack of supply that is to be expected in any market undergoing unanticipated and explosive growth in demand?

34. Fourth, can an IXC be considered to be deploying advanced telecommunications capability if it relies entirely on the facilities of an incumbent LEC to reach end users? Fifth, we invite comment on the extent to which IXCs are likely to deploy new last miles of advanced telecommunications capability, especially to serve the mass market.<sup>26</sup> Sprint recently announced a nationwide, local offering, Integrated On-Demand Network (ION), based on asynchronous transfer mode technology. Sprint describes ION as including what may be many facets of advanced telecommunications capability.<sup>27</sup> We invite comment on whether ION includes advanced telecommunications capability directed at the mass market.

35. We are also interested in the amount and adequacy of backbone between the United States and other countries. Advanced services desired by Americans may well begin or end in another country, and we want ample transport capacity on international routes as much as we do within the United States. We know, for example, that significant amounts of new backbone (especially in submarine cables) are being constructed, or could be constructed, on certain US-foreign country routes.<sup>28</sup> Will this additional backbone capacity be sufficient? Do new entrants have access to the new, high-capacity backbones? Is there any evidence that existing owners of backbone are restricting access to it? What are the barriers to deployment

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<sup>26</sup> See Bell Atlantic Reply Comments at 20 (May 6, 1998) ("The major long distance carriers will not deploy xDSL to residential customers anytime in the foreseeable future. AT&T, MCI, WorldCom and Sprint have attacked the lucrative local market for business services but have abandoned residential customers."), 21.

<sup>27</sup> *Sprint Wins Access Agreements with 4 Incumbent LECs for New Network*, COMM. DAILY, June 18, 1998, available at 1998 WL 10696675; *Sprint's Big Bang*, WIRED NEWS, <http://www.wired.com/news/news/business/story/12668.html>, visited 6/4/98 ("Sprint today announced a US\$2 billion upgrade of its network that its [sic] says will provide 'virtually unlimited bandwidth over a single existing telephone line for simultaneous voice, video calls, and data services.'").

<sup>28</sup> See e.g., "1996 Section 43.82 Circuit Status Data" (Int'l Bur. December 1997). See also MCI Communications Corp., *Memorandum Opinion & Order*, 12 FCC Rcd 15351, 15405-06 (1997).

of additional international backbone facilities?

36. We also seek comment on the relationship between last miles in other countries and the development of advanced telecommunications capability and advanced services that American consumers and businesses may desire. Are there regulatory issues related to the deployment of advanced telecommunications capability that arise internationally but not in the U.S.? Are the pro-competitive commitments of the World Trade Organization Agreement on Basic Telecommunications allowing new entrants to access necessary facilities in foreign countries at reasonable rates? Are broadband networks in the United States and other countries compatible? Will widespread deployment of advanced telecommunications capability outside the U.S., via technology that is compatible with that used in the U.S., stimulate e-commerce involving companies in the U.S., reduce the per unit cost of equipment used by consumers in the U.S., and otherwise accelerate the deployment of advanced telecommunications capability in the U.S.?

37. ISPs. This class of companies includes all providers of information services. These include, but are not limited to, the more than 4,000 providers of Internet access. The latter provide their customers with access to Internet content (such as web pages) and services (such as e-mail). The typical retail customer subscribes to the service of an Internet access provider, pays a monthly fee, and obtains access via a personal computer. Some Internet access providers, however, have also constructed or acquired some of their own Internet backbone facilities. Also, a few Internet access providers have begun to offer phone-to-phone interexchange telecommunications service via Internet backbone facilities, thereby bypassing the conventional IXCs' networks.<sup>29</sup> Likewise, some Internet access providers have created affiliates to be certificated as competitive LECs.

38. We ask for comment on how the Commission can ensure that customers are free to choose their own ISPs, especially in markets where the in-region incumbent LEC, or an affiliate of it, is the only provider of advanced telecommunications capability, such as xDSL. What, if anything, should the Commission do to promote provisioning of xDSL by incumbent LECs that does not bundle and does not direct customers to the incumbent LECs' affiliated ISPs?<sup>30</sup> Regardless of whether an incumbent LEC or an affiliate offers xDSL service, should the Commission require this service to be provided to independent ISPs and the affiliated ISP only on equal terms and conditions? How can the Commission ensure that independent ISPs are able to obtain efficient and competitively priced local transport services from incumbent LECs?

39. MVPDs - Cable Television. Incumbent cable television systems now pass

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<sup>29</sup> Federal-State Joint Board on Universal Service, CC Docket No. 96-45, *Report to Congress* (FCC 98-67) at ¶¶ 88-93 (released April 10, 1998).

<sup>30</sup> See *infra* note 90 and accompanying text.

virtually every home in this country and provide cable television service to approximately 66% of them.<sup>31</sup> The 34% of residences that choose not to subscribe to cable service do so, for the most part, for reasons other than lack of money.<sup>32</sup> Incumbent cable television systems continue to dominate the MVPD market, although competition for them is growing.<sup>33</sup> Their principal offering is the one-way transmission of channels of television programming to residential customers for a fee.<sup>34</sup> Parts of these offerings are regulated by this Commission and state and local governments. In some circumstances, regulators enter into agreements with system operators in which the operators agree to improve and expand the services they offer.<sup>35</sup> Some cable television systems are starting to offer telephone service and digital video services, and Internet access at speeds faster than are available over traditional telephone lines.<sup>36</sup> Newly developed modems are the primary devices that are making the latter services available. Speeds of 10-27 megabits per second (Mbps) are common. The speed of cable modems offers a many-fold increase in terms of speed of connection and data transmission over the dial-up modems currently used by most subscribers to connect to online services, the Internet and the World Wide Web.

40. Do the technical improvements to a cable television system that make possible the digital video services and Internet access mentioned in the preceding paragraph permit the deployment of advanced telecommunications capability or advanced services? We specifically request detailed information about the capabilities of modems and set-top boxes, whether supplied by cable operators or others, for deploying advanced telecommunications capability, especially to residential customers.

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<sup>31</sup> Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming, *Fourth Annual Report*, 13 FCC Rcd 1034, 1049 & nn.21-22 (1998) (Fourth Cable Competition Report).

<sup>32</sup> See, e.g., ROBERT W. CRANDALL & HAROLD FURCHTGOTT-ROTH, *CABLE TV: REGULATION OR COMPETITION*, Apps. A & B *passim*, 147 & Table B-9 (1996).

<sup>33</sup> Fourth Cable Competition Report, 13 FCC Rcd at 1038.

<sup>34</sup> *Id.* at 1050.

<sup>35</sup> For example, Arlington County, Virginia, and its cable system operator may execute a new franchise agreement that will lead to a hybrid fiber-coaxial system allowing high-speed Internet access for all customers and, for public schools, cable modems and free Internet access. *Arlington To Weigh Cable TV Proposal*, WASHINGTON POST, May 21, 1998, at V-1, available at [www.washingtonpost.com/wp-s...te/1998-05/21/0721-052198-idx.html](http://www.washingtonpost.com/wp-s...te/1998-05/21/0721-052198-idx.html), visited May 26, 1998. Also, through Commission-approved social contracts, cable operators have agreed to complete system upgrades and, in some cases, to provide Internet access to schools and libraries. Implementation of section 703 (e) of the Telecommunications Act of 1996, *Report & Order*, 13 FCC Rcd 6777, 6794 n.125 (1998) & cases cited therein; Social Contract for Comcast Cable Communications, Inc., *Order*, 13 FCC Rcd 3612 (1997).

<sup>36</sup> Fourth Cable Competition Report, *supra* note 31, 13 FCC Rcd at 1063-69. The telephone services are sometimes provided over cable tv facilities. See, e.g., Comments of United Homeowners Association *et al.* on Bell Atlantic Petition, Attachment 2 at 5 (April 6, 1998).

41. MVPDs - Other. Other MVPDs may deploy advanced telecommunications capability to offer advanced services to residential customers. A supplier of "wireless cable," CAI Wireless Systems, Inc.,<sup>37</sup> now offers high-speed Internet access service<sup>38</sup> and claims that the wireless cable industry "has the potential to support two-way voice and data services including high-speed 27 Mbps Internet access services that are not widely available today."<sup>39</sup> We request comment on whether the capability to provide these services would constitute advanced telecommunications capability, and on the regulatory or other barriers to wireless cable providers' ability to deploy it widely.<sup>40</sup> For example, would a wireless cable system have the capacity to provide different streams of data at 27 Mbps simultaneously to multiple customers? We also ask for information about the barriers to deployment of advanced telecommunications capability by other MVPDs.

42. High-Bandwidth Wireless - Terrestrial. The Commission has auctioned large quantities of high-bandwidth spectrum to terrestrial users, and intends to auction more, in quantities that appear large enough to support advanced telecommunications capability.<sup>41</sup> Some licensees are using, and other would-be licensees have expressed interest in using, this spectrum to offer the last mile and backbone of several services that seem advanced.<sup>42</sup> The

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<sup>37</sup> "Wireless cable" service is formally classified as Multichannel Multipoint Distribution Service.

<sup>38</sup> Reply Comments of CAI Wireless on Bell Atlantic Petition at 2 & n.2 (May 6, 1998) ("Reply Comments of CAI Wireless") ("CAI currently offers a high-speed Internet access service that provides a downstream data rate of 27 Mbps, which is orders of magnitude faster than Internet services using traditional telephone-based modems," while noting that "a regular telephone line is used for the return path" and asking for regulatory changes that would obviate the need for such a line). New wireless cable services may also be provided on the recently licensed LMDS spectrum, *infra* note 41.

<sup>39</sup> Reply Comments of CAI Wireless at 2 & n.2. *See also* Amendment of Parts 1, 21 & 74 to Enable Multipoint Distribution Service & Instructional Television Fixed Service Licensees to Engage in Two-Way Transmissions, *Notice of Proposed Rulemaking*, released Oct. 10, 1997, *summarized at* 62 Fed. Reg. 60025 (Nov. 6, 1997).

<sup>40</sup> Wireless cable offerings are one-way. Conventional telephone lines are used for the return communications. Reply Comments of CAI Wireless n.2 at 2 ("Full-motion video, audio, and data from the Internet is downloaded via the [wireless cable] channel, while a regular telephone line is used for the return path").

<sup>41</sup> *See, e.g.,* Rulemaking to Amend Parts 1, 2, 21, & 25 of the Commission's Rules to Designate the 27.5-29.5 GHz Frequency Band, to Re-Allocate the 29.5-30.0 GHz Frequency Band, to Establish Rules & Policies for Local Multipoint Distribution Service & for Fixed Satellite Services, *Second Report & Order, Order on Reconsideration, & Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545 (1997) (1.3 GHz at 27.5-28.35 GHz, 29.1-29.25 GHz, and 31.0-31.3 GHz for virtually any service), *aff'd*, *Melcher v. FCC*, 134 F.3d 1143 (D.C. Cir. 1998).

<sup>42</sup> *See, e.g.,* Fred Dawson, *WinStar to Deploy Point-to-Multipoint Network*, MULTICHANNEL NEWS, Nov. 3, 1997, available at 1997 WL 8742459; John T. Mulqueen, *Winstar to Expand Long Distance, Internet & Wireless Services*, COMM. WEEK, Sept. 15, 1997, available at 1997 WL 12653283.

majority of these services appear to be targeted at the small and medium-size business market. The companies offering these services claim that their services, compared to those offered by other last-mile and backbone providers, have speedy deployment at low cost, high speeds for data communications, and high quality of service.<sup>43</sup>

43. We ask, first, whether these high-bandwidth terrestrial wireless systems and services would effect the deployment of advanced telecommunications capability and advanced services, respectively. Second, we request comment on the extent that such services are offered today, and on the likelihood, and timeline, that they will be expanded to serve the mass market. What regulatory and other barriers exist to greater, more widespread deployment of high-bandwidth wireless systems? Might such systems effect deployment of advanced telecommunications capability to currently underserved areas, such as rural areas, and to other areas where access to the customer may present logistical difficulties? Finally, we request comment on whether the spectrum that has been made available to date is adequate to allow wireless carriers to compete with wireline providers. If commenters believe additional spectrum is needed, they should identify candidate spectrum bands and recommend bandwidths that will be necessary to allow providers to offer advanced telecommunications capability.

44. In the near future, we will explore generally competition in the local exchange by providers of both fixed and mobile wireless telecommunications services. As part of that initiative, we will inquire into any barriers that may exist to wireless competition with the incumbent LECs, and what we can do to reduce or eliminate such barriers. To the extent these issues pertain specifically to the availability of advanced telecommunications capability or services, commenters are invited to address such issues in this proceeding.

45. High-Bandwidth Wireless - Satellites. Several satellite system operators now offer advanced voice, data, and video services (including applications such as distance learning and tele-medicine) in the United States.<sup>44</sup> Present users of two-way services are typically institutional or business interests with substantial and recurring needs for advanced services. Residential consumers are typically in very thinly populated areas where there is no lower-cost terrestrial-based service. Mass market services, such as Direct Broadcast Satellite services, are primarily one-way.

46. In recent years, the Commission has authorized additional satellite systems that

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<sup>43</sup> See generally Implementation of Section 6002 (b) of the Omnibus Budget Reconciliation Act of 1993 & Annual Report & Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, FCC 98-91 at App. F (released June 11, 1998) (Third CMRS Competition Report).

<sup>44</sup> Several of the better known satellite-based Internet access providers use an "asymmetric" architecture, in which data are sent to the end user using a high-bandwidth satellite link, while communications from the end user go on a traditional narrowband telephone line.



plan to offer a wide range of services to both businesses and consumers.<sup>45</sup> Prices for satellite terminals and services that use them have declined as the number of terminals sold has increased, reflecting economies of scale. At least one observer expects satellite-based systems to become "the dominant means of delivering multimedia to most users outside urban areas."<sup>46</sup> However, the price of satellite services, including necessary ground equipment, is viewed by some industry analysts as a significant factor limiting mass-market deployment.<sup>47</sup> We seek comment on whether there are regulatory or other barriers to the development of equipment that would provide full interactive capabilities, either through the use of two-way satellite communications paths, or by supplementing one-way satellite communications paths with terrestrial wireless or wireline systems? More generally, we ask for comment on the extent to which satellite systems have deployed or are planning to deploy advanced telecommunications capability. Will satellites be more capable than other technologies of providing advanced services faster, over broader areas, and internationally? Will satellites provide, or are they providing, a cost-effective means of delivering broadband services to rural areas, in particular remote elementary and secondary schools and classrooms such as in Native American areas or the Alaskan Bush? Finally, we direct parties' attention particularly to novel proposals that share characteristics of both terrestrial and satellite systems, such as Sky Station International's proposed use of platforms located in the stratosphere to build a global stratospheric telecommunications system.<sup>48</sup>

47. Over-the-Air Broadcasting. Each existing over-the-air, terrestrial television broadcaster has been allotted a second 6 MHz channel for use in the conversion to digital television. Each licensee must provide at least one free over-the-air television service on that

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<sup>45</sup> The Commission continues to authorize C- and Ku-Band systems at new orbital locations. In 1997, the Commission authorized 13 companies to provide service using Ka-Band geostationary satellites. See Assignment of Orbital Locations to Space Stations in the Ka-Band, *Order*, 13 FCC Rcd 1030 (Chief, Int'l Bur. 1997); *Order*, 12 FCC Rcd 22004 (Chief, Int'l Bur. 1997). The Commission licensed its first non-geostationary Fixed Satellite Service in 1997. See Teledesic Corp., *Order & Authorization*, 12 FCC Rcd 3154 (Chief, Int'l Bur. 1997). The Commission has also initiated additional proceedings to authorize service in previously unused frequency bands. See, e.g., Public Notice, Applications Accepted for Filing; Cut-Off Established for Additional Space Station Applications and Letters of Intent in the 36-51.4 GHz Frequency Band, 12 FCC Rcd 10450 (1997).

<sup>46</sup> Merrill Lynch, *Global Satellite Marketplace* 98, 120-21 ("satellites are the least cost solution for serving regions with low subscriber density" and defining "multimedia" to include such telecommunications applications as "High-speed corporate data, Internet access, Push data services, . . . Video conferencing, [and] Basic telephony.") (April 22, 1998).

<sup>47</sup> See J. Careless, VSATS: *On the Brink of Global Domination*, VIA SATELLITE at 32 (Dec. 1997); G. Francis, *Satellite Statistics: Charting New Directions*, VIA SATELLITE at 46 (June 1998); Merrill Lynch, *Global Satellite Marketplace* 98 at 121, 126.

<sup>48</sup> See, e.g., Amendment of Parts 2, 15, & 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, *Second Report & Order*, 12 FCC Rcd 10571, 10580-81 (1997).

new channel, but may use a portion of its digital bitstream to provide a variety of ancillary or supplementary services that may be advanced services.<sup>49</sup> Some television broadcasters have discussed the possibility of using some of their digital television bitstream to provide data services.<sup>50</sup> We request comment on the likelihood of over-the-air broadcasters doing so and of such activities constituting the deployment of advanced telecommunications capability and the offering of advanced services. In particular, would broadcasters' data services be two-way and switched? This would be significant if we decide that those characteristics are necessary elements of advanced telecommunications capability.

48. Utilities. Like the incumbent LECs, utility companies, especially those providing electric service, reach the vast majority of American homes. A growing number of utilities are using their conduit space and the telecommunications systems they built for their own internal needs to enter telecommunications and MVPD markets. These include both private<sup>51</sup> and municipal utilities.<sup>52</sup> They now offer, or could offer, mobile services and the last mile of telephone and Internet access.<sup>53</sup> We seek comment on the feasibility of such offerings. What technology would be employed, and at what cost? We also request comment on whether these present and planned activities constitute the deployment of advanced telecommunications capability. We also ask whether utilities have an incentive to begin

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<sup>49</sup> See 47 C.F.R. § 73.624(b, c); Advanced Television Systems & Their Impact Upon the Existing Television Broadcast Service, *Fifth Report & Order*, 12 FCC Rcd 12809 (1997), *on reconsideration*, *Memorandum Opinion & Order on Reconsideration of the Fifth Report & Order*, 13 FCC Rcd 6860 (1998).

<sup>50</sup> *Welfare for Broadcasters*, N.Y. TIMES, Aug. 17, 1997, § 4, at 1, available at 1997 WL 7999860 ("Sinclair, ABC and no doubt many more broadcasters will now split up their new spectrum into several channels, with each channel using the standard digital format. . . . Viewers will soon be offered new over-the-air services, like Internet communications, paging and financial or sports data. A broadcaster could become a mini-cable service."). The permitted services include data services, aural messages, teletext, interactive materials, paging services, audio signals, and subscription video.

<sup>51</sup> *RCN Sees Strong Results in Washington Market*, PR NEWswire May 28, 1998; Martha M. Hamilton, *The Power To Link Masses?; Pepco Venture to Offer Phone, Cable, Online Service*, WASH. POST, May 22, 1998, at D-1, available at 1998 WL 11581775 ("a joint venture [StarPower] of Potomac Electric Power Co. . . . and phone company RCN Corp. of Princeton, N.J., began offering Washington area consumers local and long-distance telephone service and Internet connections at the end of April. By the end of the year, the company hopes to have built a network that will let it offer cable television and high-speed Internet connections as well."). The Southern Co. of Atlanta is beta-testing wireless services for businesses "on top of" its private specialized mobile radio network. *ADTRAN Ships Tracer for Wireless T1 Transmission; Ideal for PCS, International & Other Fast-Growing Wireless Markets, Tracer Delivers*, BUSINESS WIRE, Feb. 23, 1998.

<sup>52</sup> See, e.g., *City-Owned Electric Company to Overbuild TCI System in Tacoma, Wash.*, WARREN'S CABLE REG. MONITOR (May 26, 1997), available at 1997 WL 10096974; Pat Blake, *Competition Rounds the Bend*, TELEPHONY (Aug. 14, 1995), available at 1995 WL 10013349.

<sup>53</sup> Reply Comments of Comcast Corp. at 12 n.30 (May 6, 1998) ("It is also possible to deliver high-speed Internet data over electric power lines"). See also the web page of the Utilities Telecommunications Council, <<http://www.utc.org/>>, "Business Development" & "Publications" pages.

providing advanced services on a wide scale. Some observers see such an incentive coming from the ongoing deregulation of the energy market and the utilities' consequent need to diversify into new lines of business.<sup>54</sup> Are utilities particularly promising entrants into advanced services for the mass market because of their existing fiber optic plant, conduits, rights of way, billing and customer service operations, experience with complex communications systems for their internal operations, and brand names and reputations? Are there any special regulatory or other barriers that utilities face in entering the market for advanced services?

49. Commercial Mobile Radio Services (CMRS). CMRS providers include cellular, personal communications services (PCS), specialized mobile radio, and paging companies. They generally offer narrowband voice and data telecommunications services to business and residential customers. We understand that data services by cellular and PCS companies are "still fairly new"<sup>55</sup> and that the bandwidth of CMRS channels may be too narrow to support high-speed data communications at present. However, international negotiations are now taking place on the development of so-called "third generation" wireless systems and services, which are expected to feature data and multimedia applications as one of their main components.<sup>56</sup> Also, several CMRS companies are planning to deploy fixed services, variously known as "fixed wireless access" or "wireless local loop," in addition to their mobile offerings.

50. We welcome comment on the ability and incentives of CMRS carriers to deploy advanced telecommunications capability in both fixed and mobile wireless applications. We are also interested generally in the potential for advanced telecommunications capability to be deployed on spectrum below 2.5 GHz, and especially in the potential for that spectrum to be a substitute for wireline last miles. Is any of this spectrum unused? Is any current user likely to have an economic incentive to use it for advanced telecommunications capability? We ask for comments on regulatory barriers that stand in the way of greater use of CMRS spectrum for advanced services, whether fixed or mobile. Can such services offer advanced services on a par with, or better than, wireline services? Commenters who answer in the negative should identify any regulatory barriers and suggest how they can be removed.

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<sup>54</sup> See, e.g., *Report Suggests Utility Involvement in Telecom at Some Level is Inevitable*, ELEC. UTIL. WK. DEMAND SIDE REP. 5 (Feb. 26, 1998), available at 1998 WL 10028664 ("As the electric industry becomes more competitive, utilities will have no choice but to become involved in at least the edges of the telecommunications business to maintain market share and profitability.").

<sup>55</sup> Third CMRS Competition Report, *supra* note 43, at 60.

<sup>56</sup> See International Telecommunication Union, Final Acts of the World Radiocommunication Conference, 1997, Res. 721, "Agenda for the 1999 World Radiocommunication Conference," item 1.6. See also Paula Bernier, *Cellular Industry Looks to Promise of 3G*, X-CHANGE MAGAZINE, <<http://www.vpico.com/xc/articles/822feat5.stm>>, visited Feb. 26, 1998.

51. Private Systems. Many large consumers of telecommunications, such as government entities and large businesses, operate private wire and radio communications systems for their own internal activities (deliveries, maintenance in the field, metering, *etc.*).<sup>57</sup> We ask, first, whether these private systems contain the raw materials for a significant amount of advanced telecommunications capability, both backbone and last mile. We ask whether operators of these private systems have an incentive to deploy advanced telecommunications capability and offer advanced services on a large scale to the mass market. Do private systems, as presently configured, access the mass market, or are they mostly internal to business and government premises? If a private user wishes to enter the mass market, are there legal, technical, or regulatory barriers that could prevent private systems from offering commercial service to the general public or other private users?

52. We also note that private data networks, many of which use different technologies, appear to be relying increasingly on the public, switched telecommunications network (PSTN) to interconnect their high-speed backbones.<sup>58</sup> The interconnection of different technologies can sacrifice efficiency significantly.<sup>59</sup> We ask for comment on whether there are efficiency problems that can be corrected through standardization of technology interfaces. If there are such problems, should the Commission encourage such standardization? Would such activity by the Commission increase interconnectivity and thereby further the deployment of advanced telecommunications capability?

53. "The Last Hundred Feet." In addition to the last mile, we ask for comment about the "last hundred feet" for advanced telecommunications capability, such as inside wire within retail customers' premises or wireless local area networks, and demarcation points where inside wire ends and a service provider's network begins.<sup>60</sup> For example, many owners of office buildings, multiple dwelling units (MDUs), and trailer parks control the wiring within their buildings or premises. Does current law or regulation provide any basis on which to open up access to the last hundred feet in office buildings, MDUs, and other non-residential settings to ensure that customers have easy access to the choices they want? What are the advantages and disadvantages of mandating such access?

54. We also ask for comment on whether the spectrum we have made available for

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<sup>57</sup> Some of these entities are the utilities mentioned in ¶ 48 above.

<sup>58</sup> See, e.g., DARREN L. SPOHN, DATA NETWORK DESIGN 755 (1997).

<sup>59</sup> *Id.* at 729-31.

<sup>60</sup> See 47 C.F.R. § 68.3; Implementation of the Cable Television Consumer Protection & Competition Act of 1992, Cable Home Wiring, *Report & Order*, 8 FCC Rcd 1435 (1993).

unlicensed operations<sup>61</sup> or spread spectrum technology will allow for more "last hundred feet."<sup>62</sup> Does this spectrum have the bandwidth necessary for advanced telecommunications capability?<sup>63</sup> Do our existing rules about unlicensed spectrum, or our Part 15 and 68 rules,<sup>64</sup> our network disclosure rules,<sup>65</sup> or our recently adopted rules about MVPD set-top boxes<sup>66</sup> affect the deployment of advanced telecommunications capability? If any of these rules or others could be made more accommodating to advanced telecommunications capability, we ask for specific proposals to that end.

55. Others. We welcome comment on other types of companies that would have the assets, abilities and incentives to deploy advanced telecommunications capability and, at the retail level, to offer advanced services to retail consumers, especially residential ones. These might include alarm companies, foreign telecommunications companies, and foreign public utilities.

56. In General. We are struck by the large number of companies that assert they have or soon will have the capability to deploy what appear to be major elements of advanced telecommunications capability and many advanced services. These companies may produce a significant degree of competition, conceivably even for rural access to backbones and for rural and residential last miles. Is such an optimistic scenario realistic? If it is, how can we create incentives for such competitive entry? Conversely, how will creating such incentives affect the deployment of advanced services in the longer term?

57. Does any company, or any class of companies, have significantly more elements of advanced telecommunications capability than others, and a significantly greater incentive to deploy them promptly? Does it appear that "the race" to deploy advanced telecommunications capability is one that only one runner or a few runners can win (that is, a

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<sup>61</sup> See, e.g., Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, *Memorandum Opinion & Order and Fourth Notice of Proposed Rule Making*, 12 FCC Rcd 12212 (1997); Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range, *Report & Order*, 12 FCC Rcd 1576 (1997).

<sup>62</sup> We also request comment whether any unlicensed spectrum could be used for last miles.

<sup>63</sup> For example, unlicensed point-to-point links currently operate at 900 MHz, 2.4 GHz and 5.8 GHz at data rates in the T1 range.

<sup>64</sup> 47 C.F.R. §§ 15.1 *et seq.*, 68.1 *et seq.*

<sup>65</sup> 47 C.F.R. §§ 64.1, 68.1, 51.325 *et seq.*

<sup>66</sup> Commission Adopts "Navigation Devices" Rules Creating Consumer Market for Set Top Boxes & Other Equipment Used With Video Programming Systems, Report No. CS 98-11 (June 11, 1998), available at 1998 WL 306795. Although this proceeding was recently concluded, the record may not have included full consideration of the relationship between such devices and advanced telecommunications capability.

natural monopoly or oligopoly)? Or is the market, especially the last mile market, one that seems capable of supporting many entrants?

58. It is also possible to conclude from the above discussion that individual companies have different assets, and different abilities and incentives to deploy different elements of advanced telecommunications capability, especially in the last mile, in different locations and at different speeds. We ask for comment on this possibility and, if it is likely, on its implications. Should we expect that in one area a cable television company will be first to deploy and offer an advanced service (perhaps an advanced data and video network designed to appeal to residential customers), while in another an incumbent LEC will be first (perhaps offering broadband data communications for businesses)? We also ask for comment on whether the large-scale deployment of advanced telecommunications capability, especially in the last mile, will start in each area, or nationwide, with an initial spark of deployment by one entrant? For example, when a cable television system deploys cable modem service, will the incumbent LEC promptly deploy xDSL?

#### **B. Reasonable and Timely Deployment**

59. Section 706(b) requires that the Commission "determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion." We ask, first, how to make the statutory determination whether deployment is occurring "in a reasonable and timely fashion." For example, is the event whose occurrence we must detect the deployment of new facilities, or the actual use of services by subscribers? Second, must we, or should we, adopt a time-specific schedule or set objective targets to meet this requirement? If we should, what would the schedules or targets be? Also, we recognize that the Act requires that we promote deployment of advanced services in a competitive, deregulatory environment. To what extent should the time frames for deploying other technologies inform our interpretation of reasonable, timely deployment? What technologies should we look to for guidance regarding these time frames?

60. It appears to us that, in determining whether advanced telecommunications capability is being deployed in a reasonable and timely fashion, we should have the clearest possible idea of the demand for it and for advanced services -- of actual responses by consumers. We therefore request comment on the nature of the demand for advanced telecommunications capability and advanced services. Does the explosive growth of the Internet indicate an immediate demand for Internet access at higher speeds than are now standard, and for other forms of advanced services? Are there other retail applications of advanced telecommunications capability for which there is an equally or more demonstrable demand and need at present? More broadly, will demand for advanced services tend to be homogeneous, or will it tend to vary among different regions, neighborhoods, and types of customers (based on age, education, income, *etc.*), each wanting a different mix of voice, data, graphics, and video? We request comment on whether, if the precise demand for advanced telecommunications capability is unclear, the best general policy would be to

stimulate the deployment of "raw" capability that would be fungible enough to satisfy whatever demand evolved. Would a policy that encouraged the creation of capability that could offer data if it turns out the greatest demand is for data, or offer video if it turns out the greatest demand is for video, best serve the public interest? Conversely, we seek comment on the extent to which we should allow the market to satisfy such demand.

61. We invite parties to tell us the extent to which advanced telecommunications capability and advanced services are already deployed in this country, are being deployed, or are likely to be deployed. Where exactly has deployment occurred, by whom, in what form, and for what customers? Are any companies now providing, or close to providing, all the elements of advanced telecommunications capability (backbone, last mile, content)? Does it appear, so far, that initial deployment will be largely limited to business customers and in urban areas, and will only later reach less immediately profitable markets? Are there indications that some elements of advanced telecommunications capability will, like cable television, appeal mainly to residential customers? Does it appear that the deployment of advanced telecommunications capability and the growth of demand for advanced services will occur slowly in the early years, as was the case with cable television and cellular service?<sup>67</sup> If so, what conclusions should we draw from this? What are the advantages and/or disadvantages of possible regulatory actions by the Commission to ensure that these services reach less profitable customers? Would these actions be consistent with section 706 and the overall framework of the Act?

62. We seek information about instances in which advanced telecommunications capability has been deployed in other countries. We invite comment on the precise forms of demand that have materialized, whether this demand was satisfied in whole or in part by private investment, and what government policies (if any) helped or hurt the deployment.<sup>68</sup> For example, some reports indicate that use of the Internet is particularly intense in Scandinavian countries.<sup>69</sup> Is this true and, if so, what are the underlying factors? Are fiber-to-the-home and packet-switched networks being built in other countries for large users and for the mass market? What steps, if any, are being taken to extend such networks into rural and low-income areas and to educational institutions? If such networks are being built in

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<sup>67</sup> In 1984, decades after the introduction of cable television, it had only 37 million subscribers. In June 1997, subscribers numbered over 64 million. In 1989, five years after the first commercial offering of cellular service, there were only 2.7 million subscribers. Today, subscribership is over 55 million. See Competition, Rate Deregulation & the Commission's Policies Relating to the Provision of Cable Television Service, *Report*, 5 FCC Rcd 4962, 5039 (1990); Fourth Cable Competition Report, *supra* note 31, 13 FCC Rcd at 1039; Third CMRS Competition Report, *supra* note 43, at Table 1.

<sup>68</sup> See, e.g., Thomas J. Duesterberg, *Addicted to Data: The Need for More Bandwidth on the Information Superhighway* at 2, Jan. 8, 1998, available at <http://www.hudson.org/bandwidth.html>, visited May 13, 1998 ("France, Germany, and some Scandinavian countries have universally available ISDN service.").

<sup>69</sup> IDC: *Internet Connections in Europe Will Reach 30.5 Million by 2001 Forecasts* IDC, M2 PRESSWIRE, Feb. 18, 1998, available at 1998 WL 10217048.

other countries but not here, is one reason that they lack our universal copper-based and circuit-switched network, so they have greater incentive to start with newer technologies? For this and other reasons, does it seem that foreign experiences are, or are not, transferrable to this country? To what extent would the regulatory measures adopted in other countries, if we adopted them here, be consistent with section 706 and the overall framework of the Act?

63. Indications of demand would be particularly useful if they include data about consumers' willingness to pay. Without indications of prices that consumers actually paid, estimations of demand (and related decisions about supply) will lack an important degree of reality. For example, while there seem to be many potential deployers,<sup>70</sup> if there is not enough demand at prices that will enable them to make a competitive profit, then there would be no economic incentive for them to enter the market.

64. Schools and Classrooms. Section 706 directs particular attention to elementary and secondary schools and classrooms. We welcome comments about their particular needs, now and in the near future, and about reasonable and timely deployment for them. Are schools' needs for advanced telecommunications capability, in terms of both quantity and quality, likely to be the same as those of the areas surrounding them? If so, is it likely that private companies' deployment of advanced telecommunications capability to most or all businesses and government offices in an area will extend also to elementary and secondary schools and classrooms there? If it is unlikely, why and to what extent will elementary and secondary schools and classrooms not be reached? Will some schools and classrooms be reached, but not others? Is the problem simply financial? Or is it that the service needs of elementary schools and classrooms are different from those of other consumers (e.g., will require different technology or kinds of facilities) and are not large enough to justify private investment? To the extent that private investment does not meet the needs of schools and classrooms, will any shortage be made up by other government programs, such as ones to afford Internet access to schools and libraries, or by special private initiatives? We also request comment on the issues raised in this paragraph, but as they apply to libraries.

65. Rural Areas. We are also concerned about the demand for advanced telecommunications capability in rural areas. Today, are rural communities more dependent on telecommunications services than other communities? In general, what forms of advanced telecommunications capability will rural areas need most? Are they the same as, or different from, those in other communities? We ask that commenters address the possibility that there will be adequate supply of advanced telecommunications capability in some rural areas (e.g., affluent ones, ones relatively near major population centers), but not others.<sup>71</sup> We also ask

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<sup>70</sup> See *supra* paragraphs 18-55.

<sup>71</sup> Telephone service in rural areas, when it was "advanced," spread faster under competition than under the previous regime of unregulated monopoly and the later regime of regulated monopoly. John Brooks, TELEPHONE: THE FIRST HUNDRED YEARS 116 (by 1907, "the states with the densest concentrations of telephones per population were not the eastern states where telephony had begun, but Iowa, Nebraska, Washington, California,



that commenters consider the possibilities that wireless communications (terrestrial or satellite) will provide a cost-effective way of serving remote rural areas.

66. Possible Reasons for Slow Deployment. To the extent that any party believes that advanced telecommunications capability is not being deployed in a reasonable and timely fashion, or foresees that it will not be, we ask that it state the reasons why. Reasons could include a lack of capital, lack of technology, unavailability of necessary inputs held by the government or industry incumbents, and barriers created by law and regulation. If a party claims lack of capital as a basic cause, we ask it to explain whether the basic problem is that demand is so unclear that investors will not finance it. If a party believes that lack of technology is the basic cause of a shortage of supply of advanced telecommunications capability, we ask it to examine the prospects for development of that technology. Does the technology exist, but not at an affordable price for most or all Americans? Would the price be affordable if a mass consumer acceptance and demand developed, as has been the case over time with long distance and mobile service? To what extent can the Commission adopt solutions to these problems consistent with the deregulatory, market emphasis of the Act?

67. If a party claims that the government is withholding necessary inputs for advanced telecommunications capability, we ask for as specific identification as possible of the governmental unit (especially if it is this Commission) and the input (spectrum, licenses, rights of way,<sup>72</sup> franchises, roof space, other antenna locations, *etc.*). If a party believes that a law or regulation is the cause of a slow deployment of advanced telecommunications capability, we ask that it specify the law or regulation and suggest specific corrective measures. We ask that parties, in specifying such measures, strike a sensible balance between encouraging innovation and experimentation and thwarting inefficient regulations on the one hand and, on the other hand, weakening useful tariff and regulatory structures and such policy goals as universal service and network reliability.

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and Nevada") (1976); Milton Mueller, Jr., *UNIVERSAL SERVICE* 8, 25, 60, 65, 67-68 (between 1902 and 1912, "telephone penetration in the farm areas surpassed that of the urban areas") (1997). It is also an historical fact, though, that in some rural areas telephone service did not appear until affirmative government action, in the form of the Rural Electrification Administration, subsidized it starting in the 1930s. Antitrust & Communications Reform Act of 1994, House of Representatives Committee on the Judiciary, REPORT 103-559, Part 2 at 32 & n.43 at 32-33:

. . . the Bell System left rural service to the independent telephone companies, mutual telephone companies, and home-made, one-wire 'farmer lines.' . . . Even with all this independent and mutual activity and self-help effort, in 1945 less than one-third of America's farms has telephone service. . . . To respond to the rural void left by the Bell System, Congress amended the Rural Electrification Act (REA) to authorize long-term, low-interest loans for telephone organizations to extend and improve rural service. [paragraphing and citations omitted.]

<sup>72</sup> Letter from Larry Irving, Assistant Secretary for Communications and Information, United States Department of Commerce, to William E. Kennard, Chairman. FCC. July 17, 1998, at 3 (NTIA Letter)